



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: John Breeding et al. Examiner: Benjamin Layno  
Serial No. 10/615,350 Group Art Unit: 3712  
Filed: July 8, 2003 Docket No. PA0894.ap.US  
Title: PHOTOELECTRIC GAMING TOKEN SENSING APPARATUS WITH  
FLUSH MOUNTED GAMING TOKEN SUPPORTER

**MAIL STOP: APPEAL BRIEF - PATENTS**

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Alexandria, VA22313-1450

Sir:

The U.S. Patent and Trademark Office is hereby authorized to debit any costs and fees associated with this Petition to Deposit Account No. 50-1391. Appellant(s) is submitting this single copy of the Appeal Brief in Compliance with the requirements of 37 CFR 41.37(c). Appellant requests a personal appearance at the Board of Appeals, but will defer payment of the fee until after receipt of the Examiner's Amendment.

CERTIFICATE UNDER 37 C.F.R. 1.8: The undersigned hereby certifies that this Transmittal Letter and the paper, as described herein, are being facsimile transmitted to the United States Patent and Trademark Office, addressed to: Mail Stop APPEAL BRIEF – PATENTS Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450 on 10 July 2007

Mark A. Litman  
Name

  
Signature

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**REAL PARTY IN INTEREST**

The real party in interest in this Appeal is the assignee of the full right, title and interest in this Application, Shuffle Master, Inc., having a place of business at 1106 Palms Airport Drive, Las Vegas, Nevada 89119-3730.

### **RELATED APPEALS AND INTERFERENCES**

The Appellant(s), the legal representative prosecuting this application and Appeal, and the assignee are not aware of any Appeals or Interferences that will directly affect or have a bearing on the Board's of Patent Appeals and Interferences decision in this pending Appeal.

### **STATUS OF CLAIMS**

1. The remaining claims in the Application are claims 1-9 and 17-21.
2. Claims 1-9 and 17-21 have been rejected.
3. Claims 10-16 have been cancelled.

### **STATUS OF AMENDMENTS**

No amendments were made to the claims after the Final Rejection. All Amendments otherwise filed during the prosecution of the Application have been accepted without objection.

## **SUMMARY OF CLAIMED SUBJECT MATTER**

Claims 1 and 17 are the only independent claims on Appeal in this Application.

Claim 1 describes a gaming apparatus comprising: **[Page 3, lines 10-17]**

(a) a gaming table with a gaming surface having at least one predetermined location for receiving a gaming token; **[Page 3, lines 10-12]**

(b) a gaming token supporter mounted at each of the at least one predetermined location for receiving a gaming token on the gaming surface of the gaming table such that the gaming token supporter is flush with the gaming surface and forms a gaming token receiving location; **[Page 3, lines 12-15]** and

(c) a photoelectric sensor for each gaming token supporter, each photoelectric sensor providing modulated light emissions and sensing modulated light, and each photoelectric sensor being mounted to the gaming structure such that each sensor is aligned with and in sensing proximity to a gaming token supporter. **[Page 3, lines 10-17; Page 34, lines 2-10; Page 30, lines 9-12]**

Claim 17 describes a An apparatus for playing a multi-tiered game, comprising: **[Page 32, line 15 – page 33, line 9]**

(a) a plurality of gaming tables, each table having a plurality of play positions; : **[Page 32, line 15 – page 33, line 9]**

(b) wagering areas on the table, with at least one wagering area corresponding to each of the plurality of player positions; **[Page 3, lines 10-17]**

(c) a gaming token supporter flush mounted to the gaming surface to form a wagering area; **[Page 3, lines 10-17]**

(d) sensor means mounted to the plurality of gaming tables, wherein each sensor means comprises a photoelectric sensor providing modulated light emissions and sensing modulated light, and each photoelectric sensor being mounted to the gaming structure such that at least one sensor is aligned with and in sensing proximity to a gaming token supporter; **[Page 3, lines 10-17]**

(e) dealer control means at each table, connected to the sensor means, for determining whether a gaming token is present in each of the plurality of wagering areas, accumulating the betting information from each plurality of sensor means, and entering data on winning outcomes in the multi-tiered game, wherein the dealer control means includes means for entering a security code prior to entering data on winning outcomes, a plurality of inputs, each input designating one of a plurality of winning outcomes and one of the plurality of player positions at a gaming table of the multi-tiered game; and : **[Page 32, line 15 – page 33, line 9; Page 18, line 22 through page 25, line 29]**

(i) computer means operably connected to each dealer control means for continuously accumulating the betting information and winning outcome data for the multi-tiered game, calculating a prize amount for the multi-tiered game, and controlling a display means operably connected to the computer means for displaying the prize amount for the multi-tiered game. : **[Page 32, line 15 – page 33, line 9; Page 18, line 22 through page 25, line 29]**



### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

Solely for the purposes of expediting this Appeal and complying with the requirements of 37 C.F.R. 1.192(c)(7), the following grouping of claims is presented. This grouping is not intended to constitute any admission on the record that claims within groups may or may not be independently asserted in subsequent litigation or that for any judicial determination other than this Appeal, the claims may or may not stand by themselves against any challenge to their validity or enforceability.

1. Claim 1 is rejected under 35 USC 102(b) as anticipated by Order (PCT DE99/02666; US Patent No. 6,609,710) and Canadian Patent No. 2,195,329 (published 17 May 1996).

2. Claims 2-7 are rejected under 35 USC 103(a) as unpatentable over Order (as above) and further in view of Brown (US Patent No. 5,909,876)

3. Claims 8 and 9 are rejected under 35 USC 103(a) as unpatentable over Order (as above) and further in view of Brown (US Patent No. 5,909,876) and Paulsen (US Patent No. 5,393,067)

4. Claims 17-21 have been rejected under 35 USC 103(a) as unpatentable over Order (as above) in view of Kim et al. (US Patent No. 6,446,864) and Jones et al. (US Patent No. 4,861,041)

## ARGUMENT

### 1. Claim 1 is rejected under 35 USC 102(b) as anticipated by Order (Canadian Patent No. 2,195,329)

Although the PTO has cited numerous texts of an Order reference against the present application, because of the priority date available under 35 USC 120 for the present claims, it is believed that only the Canadian Patent Application with a 1996 publication date is even theoretically available as a prior art reference. Both the PCT published application and the US Patent have later available priority dates. Only the Canadian Patent can therefore be considered in this rejection. The table below shows a direct comparison of the disclosure in the Canadian Order Patent and the subject matter of claim 1.

CLAIM 1	ORDER DISCLOSURE	COMMENTS
A gaming apparatus, comprising: (a) a gaming table with a gaming surface	A gaming apparatus for professional execution of table games using playing dice and chips, said gaming apparatus comprising: a gaming table with a game cloth and sections, lines, areas or zones, predefined on the game cloth,	
having at least one predetermined location for receiving a gaming token;	: a gaming table with a game cloth and sections, lines, areas or zones, predefined on the game cloth,	
(b) a gaming token supporter mounted at each of the at least one predetermined location for receiving a gaming token on the gaming surface of the gaming table	"...gaming apparatus comprising a gaming table with a game cloth and sections, lines, areas or zones, predefined on the game cloth, for placement of chips for table games,..."	<b>These support areas of Order are on the gaming table and physically support chips. There is no distinct "gaming table supporter" as recited in the claims. PLUS THERE ARE NO PHYSICAL STRUCTURES MOUNTED AT EACH LOCATION.</b>
such that the gaming token supporter is flush with the gaming surface and forms a gaming token receiving		<b>The table is flat and the designated areas for placing chips are flat, but are covered by cloth and</b>

location;		<b>the detectors are under the cloth (See Page 10, lines 10-24 where the light passes through the cloth).</b>
and (c) a photoelectric sensor for each gaming token supporter,	wherein said means for detecting analysing, displaying and storing includes detectors arranged under the game cloth of the gaming table for detecting which of said sections, said lines, said areas or said zones said chips occupy, means for automatically detecting locations at which stakes in the form of the chips are placed and thus the type of bets placed,	In the present invention, to automatically detect whether chips or piles of chips have been deposited or not on a surface or zone or line defined by the layout of the playing area of the Craps table, it is thus possible to use detectors which are arranged under the game cloth and which respond to changed pressure conditions or changed light conditions upon the setting down or removal of the chips. Preferably, light-sensitive sensors, in particular photo-diodes sensitive to IR-light, are used under such a game cloth which is partially light-transparent. The darkening of the photo-diodes caused by the deposited chip then triggers a signal which is fed to an automatically recording computer unit. The active yes-no circuit only indicates whether a chip is placed on the gaming table or not; accordingly these detectors are known as occupation detectors.
each photoelectric sensor providing modulated light emissions and sensing modulated light,	Preferably, light-sensitive sensors, in particular photo-diodes sensitive to IR-light, are used under such a game cloth which is partially light-transparent. The darkening of the photo-diodes caused by the deposited chip then triggers a signal which is fed to an automatically recording	<b>The rejection asserts that Order's sensors inherently provide modulated light, citing page 17, lines 20-24. THERE IS NO BASIS FOR THIS ASSUMPTION. APPLICANTS CHALLENGE THIS ASSUMPTION. Modulated light requires</b>

	computer unit. The active yes-no circuit only indicates whether a chip is placed on the gaming table or not; accordingly these detectors are known as occupation detectors.	<b>a change in the light provided from the photoelectric sensor device, while Order discloses only a light receiver, not a modulated light source. Order uses ambient light. It is impossible for the non-existing emitter in the Order device to provide and sense modulated light.</b>
and each photoelectric sensor being mounted to the gaming structure such that each sensor is aligned with and in sensing proximity to a gaming token supporter.	it is thus possible to use detectors which are arranged under the game cloth and which respond to changed pressure conditions or changed light conditions upon the setting down or removal of the chips.	<b>The sensors are not flush mounted, but are under the table cloth. This deteriorates light sensitivity, as noted by Order, requiring multiple sensors.</b>

Applicants do not concede the assumptions in this rejection, and Applicants point out that the teachings of Order are insufficient as a matter of law under 35 USC 102(b) as a teaching of the limitations recited in the claims, especially with respect to emitting modulated light and flush mounting.

The Order reference completely fails to teach an object sensor containing a light source. For this reason alone, the rejection must fail.

In addition, light modulation requires a specific content in the character of the light provided in the system. A typical definition for modulation (with regard to electromagnetic transmission) would be:

“Modulation is the addition of information (or the signal) to an electronic or optical signal carrier. Modulation can be applied to direct current (mainly by turning it on and off), to alternating current, and to optical signals.

As Order uses ambient light and merely blocks out light, there are no “modulated light emissions” as required by the system. Because there is no optical signal carrier, Order cannot teach the addition of information to any optical signal carrier. Order has no light emitting capacity in the under the cloth receptors. The use of modulated light is immaterial to Order because Order senses the absence of light, while the present technology senses light reflected from the token, the light source in the sensor. If the

light were not modulated, the system of Appellants would sense ambient light as equivalent to the reflected light, and the efficiency of the system would be greatly diminished. Order is completely devoid of any teaching of modulated light and therefore must fail under this rejection.

The rejection is clearly insufficient and the rejection must be withdrawn.

**2. Claims 2-7 are rejected under 35 USC 103(a) as unpatentable over Order (as above) and further in view of Brown (US Patent No. 5,909,876)**

Even if Brown is prior art to the present invention, the reference does not overcome the deficiencies of Order identified above. Brown is not even cited to show modulation of light in a sensor receiver for detection of gaming wagers and cannot correct the deficiencies of Order. As shown below, Brown is not available as a reference under US Regulations and Laws.

The priority date for the claims on Appeal is May 30, 1997. The available date for the Brown reference is 1998. The table below specifically shows the location of antecedent basis for claim in this Appeal in the May 30, 1997 priority application, which antedates the Brown available reference date.

<b>CLAIM 1</b>	<b>08/866,516 DISCLOSURE</b>
A gaming apparatus, comprising: (a) a gaming table with a gaming surface	As shown in Fig. 1, a playing table 10 has seven player positions 18a-g. <b>Page 25</b>
having at least one predetermined location for receiving a gaming token;	A suitable wagering area or apparatus for receiving or indicating a wager and entry fee...is represented at area 23a-g. <b>Page 25</b>
(b) a gaming token supporter mounted at each of the at least one predetermined location for receiving a gaming token on the gaming surface of the gaming table	Each sensor device...is located under each of the wagering areas 23a-g. <b>Pages 27-28.</b> "The sensor device 118 comprises a housing 136, a cover plate or gaming token supporter 138..." <b>Page 32</b>
such that the gaming token supporter is flush with the gaming surface and forms a gaming token receiving location;	"...a sensor device 118 is mounted below a wagering area 23a-g and is mounted adjacent the bottom of the table surface 16." <b>Page 32</b> "...the gaming token supporter 138 is flush mounted..." <b>Page 39</b>
and (c) a photoelectric sensor for each gaming token supporter,	In the preferred embodiment, an Omron photoelectric sensor having model number EE-SPZ401A is used. <b>Page 34.</b>
each photoelectric sensor providing modulated light emissions and sensing modulated light,	The attached data sheet for the Omron EE-SPZ401A photosensor clearly identifies it as modulated light.
and each photoelectric sensor being mounted to the gaming structure such that	"...the sensing apparatus will be located below each one of the wagering areas 23a-g

each sensor is aligned with and in sensing proximity to a gaming token supporter.	and located adjacent to the bottom of the table surface 16, such that the sensor device 118 is aligned with a wagering area 23a-g.” <b>Page 36.</b>
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As can be readily seen, the original specification as filed in the US Serial No. 08/866,516 application having a filing date of 30 May 1997 provides literal and conceptual antecedent basis for the limitations in the claims and therefore antedates the available reference date of the Brown reference of March 30, 1998, the available reference date of the Brown Patent.

The Brown reference is not available as a reference under any statutory basis against these claims.

**3. Claims 8 and 9 are rejected under 35 USC 103(a) as unpatentable over Order (as above) and further in view of Brown (US Patent No. 5,909,876) and Paulsen (US Patent No. 5,393,067)**

As the Order reference is not a sufficient teaching of the limitations of light modulation and flush mounting, the rejection is in error and must be withdrawn as the addition of this reference does not overcome that deficiency.

Additionally, the Brown reference has an available reference date of **March 30, 1998**. This reference date is after the clear priority date for this application and the claimed subject matter of at least May 30, 1997. The Brown reference is not available as a reference under any statutory basis against these claims.

The Paulsen reference has not been asserted to teach everything that is absent from Order and Brown, and so the Paulsen reference fails to overcome the underlying deficiencies in the rejection over Order in view of Brown. Therefore, the rejection must fail. As this rejection relies on Brown and as that reference is unavailable, the rejection must fail.

**4. Claims 17-21 have been rejected under 35 USC 103(a) as unpatentable over Order (as above) in view of Kim et al. (US Patent No. 6,446,864) and Jones et al. (US Patent No. 4,861,041)**

The Order reference is not a sufficient teaching of the limitations of light emanation, light modulation and flush mounting, so that the underlying rejection is in error. The secondary references (Kim and Jones) have not been cited to correct these

deficiencies. The rejections must be withdrawn as the addition of these references do not overcome that deficiency.

Additionally, the Kim reference has an available reference date well after the clear priority date for this application and the claimed subject matter. Appellants have shown in detail by reference to an earlier published application text in the claimed priority chain for antecedent basis for priority for the limitations of claim 17 of at least May 30, 1997. The Kim reference is not available as a reference under any statutory basis against these claims. All substantive information in claim 17 (including the game limitations) are found in the specification as filed for the **1997** priority Application. The Kim reference is not an available reference.

As the Patent and Trademark Office relies upon the Kim reference to sustain this rejection and that Kim reference is unavailable as a prior art reference, this rejection is *prima facie* untenable and must be reversed.

## CONCLUSION

All rejections of record have been shown in detail to be in error. The rejection should be reversed and all claims should be indicated as allowable.

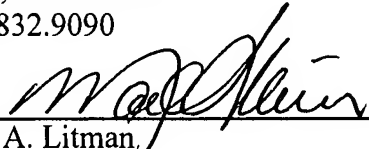
Applicants believe the claims are in condition for allowance and request reconsideration of the application and allowance of the claims. The Examiner is invited to telephone the below-signed attorney at 952-832-9090 to discuss any questions that may remain with respect to the present application.

Respectfully submitted,  
JOHN BREEDING et al.

By their Representatives,  
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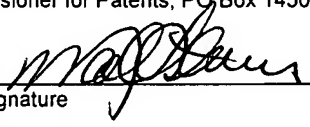
Date 10 July 2007

By

  
Mark A. Litman,  
Reg. No. 26,390

CERTIFICATE UNDER 37 C.F.R. 1.8: The undersigned hereby certifies that this Transmittal Letter and the paper, as described herein, are being facsimile transmitted to the United States Patent and Trademark Office, addressed to: Mail Stop APPEAL BRIEF – PATENTS, Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450 on 10 July 2007

Mark A. Litman  
Name

  
Signature



## CLAIMS APPENDIX

1. (REJECTED) A gaming apparatus, comprising: (a) a gaming table with a gaming surface having at least one predetermined location for receiving a gaming token; (b) a gaming token supporter mounted at each of the at least one predetermined location for receiving a gaming token on the gaming surface of the gaming table such that the gaming token supporter is flush with the gaming surface and forms a gaming token receiving location; and (c) a photoelectric sensor for each gaming token supporter, each photoelectric sensor providing modulated light emissions and sensing modulated light, and each photoelectric sensor being mounted to the gaming structure such that each sensor is aligned with and in sensing proximity to a gaming token supporter.
2. (REJECTED) The apparatus of claim 1, wherein the gaming token supporter forms a portion of a sensor housing.
3. (REJECTED) The apparatus of claim 2, wherein the sensor housing comprises a first board having a outer edge and at least one continuous inner edge, the inner edge forming a sensor holder, the sensor holder having dimensions such that a sensor can be received by the sensor holder and the sensor holder positioned such that the received sensor will be aligned and in sensing proximity to the gaming token supporter.
4. (REJECTED) The apparatus of claim 3, wherein the sensor is formed by one of a photoelectric sensor and a non-photoelectric proximity sensor.
5. (REJECTED) The apparatus of claim 3, further comprising a decoder electrically connected to each sensor for determining whether a gaming token is present at the gaming token location monitored by each sensor.
6. (REJECTED) The apparatus of claim 5, wherein the first board comprises a plurality of continuous inner edges forming a plurality of holders, wherein a plurality of lighting devices may be received by the holders
7. (REJECTED) The apparatus of claim 6, wherein the lighting devices are connected to the decoder.

8. (REJECTED) The apparatus of claim 5, wherein the decoder is a microcontroller.

9. (REJECTED) The apparatus of claim 5, wherein the decoder is a hard wired circuit.

10. (CANCELLED)

11. (CANCELLED)

12. (CANCELLED)

13. (CANCELLED)

14. (CANCELLED)

15. (CANCELLED)

16. (CANCELLED)

17. (REJECTED) An apparatus for playing a multi-tiered game, comprising: (a) a plurality of gaming tables, each table having a plurality of play positions; (b) wagering areas on the table, with at least one wagering area corresponding to each of the plurality of player positions; (c) a gaming token supporter flush mounted to the gaming surface to form a wagering area; (d) sensor means mounted to the plurality of gaming tables, wherein each sensor means comprises a photoelectric sensor providing modulated light emissions and sensing modulated light, and each photoelectric sensor being mounted to the gaming structure such that at least one sensor is aligned with and in sensing proximity to a gaming token supporter; (e) dealer control means at each table, connected to the sensor means, for determining whether a gaming token is present in each of the plurality of wagering areas, accumulating the betting information from each plurality of sensor means, and entering data on winning outcomes in the multi-tiered game, wherein the dealer control means includes means for entering a security code prior to entering data on winning outcomes, a plurality of inputs, each input designating one of a plurality of winning outcomes and one of the plurality of player positions at a gaming table of the multi-tiered game; and (i) computer means operably connected to each dealer control means for continuously accumulating the betting information and winning outcome data for the multi-tiered game, calculating a prize amount for the multi-tiered game, and controlling a display means operably connected to the computer means for displaying the prize amount for the multi-tiered game.

18. (REJECTED) The apparatus of claim 17, wherein the plurality of gaming tables is located at different gaming facilities.

19. (REJECTED) The apparatus of claim 18, wherein the computer means includes a plurality of facility computers, each facility computer operably connected to a plurality of gaming tables, and a central computer operably connected to the plurality of facility computers.

20. (REJECTED) The apparatus of claim 18, wherein the dealer control means, computer means, and display means are operably connected to each other by a local network.

21. (REJECTED) The apparatus of claim 19, wherein the display means includes an alphanumeric LED display.

## **EVIDENCE APPENDIX**

1) In an Amendment filed on 6 November 2006, Appellants submitted a declaration and attached evidence by the Counsel of Record, Mark A. Litman. The attachment in this Declaration included a copy of the specification as filed for US Patent Application Serial No. 08/866,516, filed May 30, 1997. This 1997 Application is part of the priority chain (directly from the present application as a continuation-in-part) claimed in the present application.

2) The specification has been included as evidence to show that the language of the claimed subject matter in this Appeal has a priority date at least at the time of filing the 1997 application, **30 May 1997**, and that any reference cited in a rejection against the present application with an available reference date that is after 30 May 1997 is unavailable as a reference under US Patent Regulations, Laws and Rules.

3) A copy of the Declaration and the attached specification is provided along with this Brief on Appeal.

4) Also mentioned in the declaration was an “data sheet for the Omron EE-SPZ401A photosensor” which identifies it as modulated light. A copy of the published data sheet for that specific model of Omron photosensor is also provided in support of the declaration and antecedent basis for the term “modulated light.”

## **RELATED PROCEEDINGS APPENDIX**

Neither Appellants nor their counsel on this Appeal are aware of any proceedings before the US Patent and Trademark Office or any US Judicial or Quasi-Judicial authority that relates directly towards any issues in this Appeal.



### Technical Field

## Background of the Invention

1

U.S. Patent No. 5,393,067 to Paulsen et al. ("Paulsen") discloses a coin acceptor

2 for use in a prior art apparatus for automatically sensing the presence of gaming  
tokens used in cardroom gaming. The Paulsen coin acceptor is a circular disk the  
4 under side of which is placed directly on top of the conventional felt on the table.

The disk has a concentric, circular recess in its upper side that is shaped to accept the  
6 coin. The outer periphery of the disk is frustoconically shaped and extends from  
about the under side of the upper side at an appropriately shallow angle of no more  
8 than 30° so that players can readily slide a coin along the felt, up the frustoconical  
ramp of the disk, and into the recess to place a bet. A coin acceptor of the type  
10 disclosed in Paulsen has several problems: (1) inconveniences the dealer when  
he/she is clearing the table; (2) slows down the number games that may be played in  
12 a given period of time, thereby reducing the potential revenue at a particular table;  
and (3) may reduce the longevity of clay gaming tokens.

14 First, when the dealer is clearing the table, the recess in which the coin is  
placed inconveniences the dealer because the dealer cannot sweep all the gaming  
16 tokens off the table. Because of the recessed coin acceptor, the dealer must  
individually remove each gaming token located in a coin acceptor. Thus, a coin  
18 support structure which will allow the dealer to more conveniently remove the  
coins from the gaming table would be very helpful in the cardroom gaming  
20 industry.

Second, cardroom gaming facilities want to provide players with as many opportunities to place bets as possible. In a given period of time, if the number of hands played at a table is reduced because it takes the dealer more time to remove coins from recessed coin acceptors after each played game, then less hands are played at the table, thereby reducing the number of potential bets that could be placed at the table. Clearly, a coin support structure that enables a dealer to quickly remove the coins from the table and thereby play more hands is highly desirable.

Third, some casinos use clay gaming tokens. In use, these clay gaming tokens may be slid into the recess. When a gaming token is slid into the recess, the gaming token absorbs the impact of the gaming token being pushed against the side of the recess. Over a period of time, this frequent, periodic, impact placed on a clay gaming token may cause the clay gaming token to chip, thereby rendering the clay gaming token unusable. Thus, an apparatus which may increase the longevity of a gaming token would be desirable to a casino.

Also, currently, some gaming token detecting apparatuses use metal detecting sensors. One problem with such apparatuses is that they cannot be used in a casino that does not use gaming tokens that contain metal, such as casinos that use clay gaming tokens. Consequently, an apparatus that detect non-metallic gaming tokens but yet enables fast play would be desirable.



### Summary of the Invention

2       The present invention relates to a gaming apparatus comprising a gaming  
table with a gaming surface having at least one predetermined location for receiving  
4   a gaming token. A gaming token supporter is mounted at each of the at least one  
predetermined location for receiving a gaming token on the gaming surface of the  
6   gaming table such that the gaming token supporter is flush with the gaming surface  
and forms a gaming token receiving location. A photoelectric sensor for each  
8   gaming token supporter is mounted to the gaming table such that each sensor is  
aligned with and in sensing proximity to a gaming token supporter.

10       One object of the present invention is to provide an apparatus which allows a  
dealer to conveniently remove gaming tokens from the table.

### Brief Description of the Drawings

12       Figure 1 depicts the table layout and apparatus used in playing a wagering  
14   game.

16       Figure 2 is a block diagram representing the flow of play in the wagering  
game.

18       Figure 3 is a schematic diagram of the player selection inputs and dealer  
control panel.

Figure 4 shows gaming tables connected to a facility computer by a network.

20       Figure 5 shows a plurality of facility computers linked to the central  
computer.

Figure 6 is a schematic diagram of the display board.

Figure 7 is an exploded perspective view which shows the parts of a suitable proximity sensor device.

Figure 8 is a schematic perspective view of an assembled proximity sensor device.

Figure 9 is a circuit diagram of a proximity sensor device suitable for use in the present invention.

Figure 10 is an exploded perspective view which shows the parts of an alternative suitable proximity sensor device.

#### Detailed Description

For this description of the preferred embodiment, the gaming token supporter of the present invention will be described in the context of the multi-tiered gaming apparatus used in conjunction with a table card game known as "LET IT RIDE®," as disclosed in U.S. Patent Application Serial No. 08/023,196, filed February 21, 1993, U.S. Patent No. 5,288,081, assigned to the assignee of the present invention and incorporated by reference herein. However, the gaming token supporter and the multi-tiered gaming apparatus disclosed herein can be used with other games, and the present invention is not limited to use with the game disclosed in this description of the preferred embodiment.

Referring to Fig. 1, the apparatus of the present invention includes a gaming structure which may be a typical casino gambling or gaming table 10. The table 10

has a curved side 12 for accommodating up to seven players and a straight side 14 for  
2 accommodating the dealer. The table 10 has a flat surface 16 having a top and a  
bottom. The top of surface 16 is covered with felt or other appropriate material,  
4 thereby forming a gaming surface. Although seven playing positions or locations  
18a-g for individual players are provided, it is not essential to the game that exactly  
6 seven persons play and as many as sixteen players or as few as one may participate.  
For casino play, a field of seven players provides for a game that is easily manageable  
8 by the dealer and house, and one in which the individual players feel more  
involved. A house dealer position 20, including an area suitable for displaying the  
10 dealer's common cards 21, is provided.

Each table 10 has pre-determined locations or zones for receiving gaming  
12 tokens for wagering on the basic game and predetermined locations or zones for  
receiving gaming tokens for wagering on the additional games at each player  
14 station. As shown in Fig. 1, each of the playing positions or stations 18a-g includes a  
wagering zone 22, comprising three separate and distinct wagering or betting areas  
16 22a, b, c, for receiving or placing a wager in the basic game. Each position 18a-g also  
includes a card area 19a-g for receiving and displaying cards dealt to the player  
18 occupying the position. A suitable wagering area or apparatus for receiving or  
indicating a wager in the additional game, playoff or tournament, is represented at  
20 area 23a-g. The wagering areas 22a, b, c and 23a-g receive appropriate wagering  
indicators or settling means such as gaming tokens or chips (not shown).

At one side of the dealer station 20, the apparatus for playing the multi-tiered game may include a microprocessor or computer controlled shuffling machine 32 supported by a table extension 34. The shuffling machine 32 may be of the type disclosed in U.S. Patent 4,807,884, the disclosure of which patent is incorporated herein by reference. The shuffling machine 32 may include a dealing module for automatically and sequentially dealing cards and also may include a display means for displaying wagered amounts, the identity of winning players, or other game related information, including the prize amount.

Referring to the flow diagram of Fig. 2, the initial step in playing the basic game LET IT RIDE® is preparing or shuffling a deck of cards, represented at block 40, by activating the shuffling machine 32 or by hand-shuffling a deck to provide a shuffled deck. Next, the players place a three-part initial wager, block 42, by putting equal amounts in each of the three betting areas 22a, b, c. Two of the parts of this initial wager, the parts placed in wagering area 22a and 22b, are retrievable at the option of the player. The third portion placed in area 22c is a nonwithdrawable bet. Players may also place an optional additional wager or extra fee, block 42, to participate in an additional game. After the placing of the wagers by each player, the cards are dealt, block 44, three cards being dealt down to each player and two cards are dealt down in front of the dealer.

The players inspect or "sweat" their cards in preparation for reaching decision block 46. At decision block 46, the players are queried by the dealer about whether

the first part of the initial wager, the part placed in wagering area 22a, should be left  
2 or whether the player wishes to withdraw that portion of the wager. Each player  
makes the decision at decision block 46 on the basis of the three cards forming the  
4 player's incomplete hand at this point. Once each player has been queried and has  
decided whether or not to let the first portion of the bet ride, and those bets the  
6 player chooses to retrieve or remove are physically removed from area 22a and  
returned to the player, the dealer shows one of the down common cards, as  
8 represented at block 48. Now, each player has four cards to consider, the three cards  
dealt to that player originally and the single common card showing on the table 10.  
10 Each player must then decide whether to let the second part of the initial wager ride  
or whether to withdraw it from the game. After each player is queried and decides  
12 what to do with regard to the second part of the bet, and those bets to be withdrawn  
are physically removed from area 22b and returned to the player, the dealer reveals  
14 the second common down card, as represented at block 52. Each player now has a  
five card hand comprised of the three cards each player was originally dealt plus the  
16 two revealed common cards. The third bet, the bet placed at wagering area 22c, is a  
nonretrievable portion of the initial bet and the flow of the basic game proceeds to  
18 block 54 wherein the players show or reveal their three cards to the dealer.

The dealer resolves each player's initial wager (which includes all three parts,  
20 the second and third parts or only the third part, depending on the player's choices  
during play of the hand) based on the five card hand at block 56 and determines

what payout, if any, the player is entitled to receive according to the payout schedule at the particular gaming table or casino. Bets on non-winning hands are collected by the dealer or house. The hand is then over, and the flow of the basic game returns to block 40, preparing and shuffling the deck for a new hand.

The award or payoff is given for each part of the initial or basic game bet that was allowed to ride to the end of the hand and for the nonwithdrawable part of the bet. A typical pay table would be as follows:

8	Pair, Tens or Better	1-1 (even money)
	Two Pairs	2-1
10	Three of a Kind	3-1
	Straight	5-1
12	Flush	8-1
	Full House	11-1
14	Four of a Kind	50-1
	Straight Flush	200-1
16	Royal Flush	1,000-1

With regard to the additional wagering game and method, along with placing an initial game wager, block 42, the players may place an additional wager or entry fee, thereby placing an optional side bet of a fixed, predetermined amount to become eligible to win a bonus pay-off and to participate in a tournament to become eligible to win a prize (the basic game and the additional wagering game are collectively referred to as the "multi-tiered wagering game"). It is this wager that is sensed and registered by the proximity switch apparatus of the present invention, although the invention could be utilized to register other wagers as well. The game flow then proceeds as represented in blocks 44-56. At block 56, along with resolving each

player's basic game bet, the dealer also resolves the second wager or side bet which includes eligibility to continue in a playoff or tournament game to win a prize. The second wager is resolved by the dealer immediately paying out a bonus payout to participating players according to a table. A typical bonus pay table would be as follows:

6	Straight	\$25.00
	Flush	\$50.00
8	Full House	\$100.00
	Four of a Kind	\$200.00
10	Straight Flush	\$2,000.00
	Royal Flush	\$20,000.00

Each player participating in the additional wagering game and having a final hand comprising, in the preferred embodiment, the highest one hundred winning hands registered by participating players over a given period, becomes eligible to continue tournament play to win a prize, represented at block 58.

The basic wagering game and additional game may be a lottery type game, any suitable wagering game or any suitable random process through which eligible finalists are selected and through which one of the eligible finalists is identified as the prize winner. The basic game and the additional game which culminates in a winner of the prize may be different games, and the second game may be played at a different place than the basic game.

The super prize or prize is a fixed amount set at least prior to the commencement of the second game and may be comprised of the optional second

game wagers or entry fees, or a portion thereof, accumulated for a selected period.

Where the prize is comprised of accumulated entry fees or side bets, or a portion thereof, the prize total may increase until the occurrence of a selected event such as the prize reaching a predetermined amount, a predetermined period of time has elapsed, or a predetermined number of finalists has been identified. After the occurrence of the selected event, but prior to the commencement of the second game, the prize amount is made known to the players. Where a fixed amount of money is allocated to fund the prize prior to the commencement of the additional game, the prize amount can be made known to the players prior to the commencement of the basic game.

The selected period for funding a prize must insure that a substantial number of players qualify for winning the prize, and that a substantial prize, for example, a million or multi-million dollar prize, accumulates. Ideally, the selected period is at least one month, but a typical period would be three months, particularly if the funding program or schedule set forth below is followed. Eligible finalists in the second game, i.e., all the eligible basic game players having a final hand comprising the highest one hundred hands, are accumulated during a qualification period equal to the prize accumulation period. If no royal flush has been achieved during the selected accumulation period, the next highest winning hands are used to determine eligibility for the second game. Another method that could be used to determine eligible finalists in the second game would be to have each player



registering a royal flush over a given time period to become eligible. Once the  
selected event has occurred the prize or prize pool is established and the prize  
amount is fixed.

A typical funding program for a prize when it is comprised of accumulated  
fixed side bets or entry fees may be outlined as follows. A one dollar (\$1.00) fixed  
side bet or entry fee could be required to participate in the bonus pay-off and the  
second game. Of this amount, forty-five cents (\$.45) could be used to fund  
immediate bonus payouts to players, the bonus payouts being based on a random  
outcome or certain poker rankings as set forth above. Fifty-five cents (\$.55) could be  
used to fund the prize.

The multi-tiered wagering game and method is not limited to being played  
with five card stud poker games, but may be applied or used with other appropriate  
wagering games such as other poker games or games of chance. The method for the  
multi-tiered wagering game does not require a shuffling machine 32, dealing  
module 33 or a display means 36. However, when the multi-tiered wagering game  
is played with a card game, these features facilitate and expedite the play of the game  
as well as add security (game protection), efficiency, and interest. The fee for  
participation in the additional wagering game may be in an amount other than one  
dollar, and the funding schedule set forth above may be varied. Where the prize is  
funded by accumulated fixed side bets or entry fees, the accumulation period may  
also be varied, as long as a prize sufficient to interest players accumulates. For

example, the accumulation period may be a selected time period, may be based on the accumulation of a particular amount of money, or may be based on the accumulation of a certain number of finalists.

The following instructions set forth the conceptual design and procedures for a tournament in a casino environment, wherein the prize is funded by a portion of the accumulated entry fees:

Before the basic LET IT RIDE<sup>®</sup> game is played, players may elect to pay a \$1 entry fee per hand to participate in the LET IT RIDE<sup>®</sup> Tournament. If they pay the entry fee and get a straight or higher, they will be eligible for bonus payments as follows:

Royal Flush .....	\$20,000
Straight Flush .....	\$2,000
Four of a Kind .....	\$200
Full House .....	\$100
Flush .....	\$50
Straight .....	\$25

The payout numbers are for illustration purposes only and in actual practice could be higher or lower.

Example: If a player makes three \$5 bets on LET IT RIDE<sup>®</sup> and hits four of a kind; he will receive \$750 for that bet (50 to 1). If he had also paid the \$1 tournament entry fee for that hand, he would receive a \$200 bonus for a total payout of \$950.

If a player hits a royal flush, he will be paid 1,000 to 1 for his basic bet. Again, using three \$5 bets as an example, the player would win \$15,000 for his basic bet and, if he had paid the \$1 tournament entry fee for that hand, he would receive a \$20,000 bonus for a total payout of \$35,000.

The hit frequency shows that 45¢ of the \$1 entry fee will be required to finance the bonus payment schedule. The remaining 55¢ will be put into the prize pool.

The first round of the tournament will last for a predetermined length of time (e.g., three months). At the end of that period, the players with the one hundred highest hands (plus ties) will qualify for round two of the tournament. Rounds two through five (the final round) would take place over a two day period at a host casino. All of the qualifiers that return and participate in round two of the tournament will receive a bonus (i.e., \$5,000) regardless whether they win or lose.

**Two Day Playoff:**

- Day One/Round Two – Each player will be given an equal amount of non-redeemable chips in various denominations. At the end of 50 hands, the 50 players (plus ties) with the highest winnings will advance to round three and will receive another bonus (i.e., \$10,000).
- Day One/Round Three – The 50 remaining players will reassemble at the tables and again be issued an equal amount of non-redeemable chips. The winnings from the previous round will not be carried forward. After 50

hands have been played, the 25 players (plus ties) with the highest winnings will advance to round four and receive another bonus (i.e., \$15,000).

- **Day Two/Round Four** – The 25 remaining players will return to the tables and will be issued an equal amount of chips. After 50 hands, the five players with the most money will advance to round five (the final round). Since the final round cannot have more than five players, a ten hand tie-breaker round will be played between players trying for the fifth seat.

- **Day Two/Round Five (Final Round)** – The five finalists will receive an equal number of chips and play at the same table. At the end of 50 hands, the players are ranked according to the total value of the chips they have accumulated. The payouts will be distributed as follows:

5th Place .....	\$1,000,000
4th Place .....	\$1,500,000
3rd Place .....	\$2,000,000
2nd Place .....	\$2,500,000
1st Place .....	Fixed amount larger than second place or balance of prize pool

The balance is the balance of the prize pool after all other prizes have been deducted. While this balance is not fixed at the beginning of play of the basic game, it is fixed prior to the beginning of round two of tournament play. The payout numbers are for illustration purposes only and in actual practice could be higher or lower.

### Irregularities in The Tournament:

- 2 1. At the end of each round, only players with chips remaining are eligible for  
the next round, e.g., if only forty players have chips remaining after round  
4 two, then only those forty players may advance to round three.
- 6 2. If, during the final round, several players lose all of their chips before the  
round is over, they will be ranked in the order they lost their chips, e.g., the  
8 first player to lose all his chips will take seventh place, the second player to  
lose his chips will be in sixth place, etc.
- 10 3. If two or more players lose their chips on the same hand, those players will tie  
and the prize money will be divided equally, e.g., if the first two players to  
lose all of their chips do so on the same hand, they would tie for fourth place.  
12 The prize money for the 4th and 5th places would be added together and  
divided equally among the two players.

### 14 Dealing Procedures

- 16 1. Before proceeding with each hand, the dealer asks "any tournament entries?"  
and allows each player time to place his entry fee in the designated area. The  
18 player may place either his basic game wager or his optional wager and  
tournament entry fee on the table first - the order does not matter.
- 20 2. The dealer ensures that the red entry fee lamp, or other suitable display  
means, on the gaming table is on for each player who has placed an optional  
wager and an entry fee.

3. The dealer then verifies the accuracy of each player's bet by confirming that an equal amount is placed on each of the three wagers.
4. The dealer now touches a "no more fees" switch or the "Begin Game" switch on the table control panel. Once this is done, players may not change their wagers or entry fees in any way.
5. The dealer collects the optional wager and entry fees and places them in the chip rack. (Without the dealer having to take any action, once the last coin from the optional wagers and entry fees is collected, a signal is sent to the shuffler and it automatically moves the freshly shuffled deck forward to the pre-count counting position.)
6. The dealer takes the deck from the discard rack and places it in the shuffling area of the automatic shuffler. (Once the cards are placed in the shuffling area, the shuffler automatically counts the first three cards into the forward position.)
7. The dealer takes the three cards from the front of the shuffler and places them face down on the table in front of the first player on his left, spreading the cards to verify that exactly three cards were dealt.
8. The dealer now takes the next three cards from the front of the shuffler and places them face down in front of the second player from his left, spreading them out to verify the number of cards. The dealer follows this procedure

clockwise around the table until each player who has made a wager receives a  
three card hand.

9. After each player has received three cards, the dealer places the next three  
cards from the shuffler face down in front of himself. (Although only two  
cards are used, the automatic shuffler is programmed to dispense three cards).  
These cards remain in a stack so that the two bottom cards are hidden by the  
top card. The stack is placed in the left hand rectangle of the two rectangles on  
the layout in front of the dealer.
10. The dealer touches the "card count" switch on the shuffler. The shuffler  
counts the remaining cards while moving them to the forward position.  
Before the dealer picks up the cards, he must determine whether or not the  
count is accurate. If the card count light glows green, the count is accurate. If  
the card count light flashes red, there is a miscount.
11. In case of a flashing red light, the dealer calls a floor supervisor for  
instructions before proceeding. (see "irregularities" below.)
12. If the card count light glows green, the dealer may remove the balance of the  
cards from the shuffler and place them in the discard rack.
13. While waiting for the card count light, the dealer begins the round with the  
first player on his left. The dealer allows each player in turn the option to  
reclaim his first bet or to let it ride. The dealer must not allow players to  
reach out and retrieve their own bets. If a player does this, the dealer should

politely ask him not to do so in the future. Only the dealer can return bets to a player.

14. After the first round of options, the dealer takes the top card from the stack in front of him and places it on top of the cards in the discard rack. Then he turns over the second card, placing it face up covering the bottom card. The bottom card should not be visible.

15. Again, starting on his left, the dealer gives each player in turn the option to reclaim his second bet or to let it ride. The dealer asks the players to place their hands face down either near, against, or under their chips until the hand is over.

16. The dealer moves his up card to the right hand rectangle on the layout in front of him. The dealer then turns over his bottom card. There should now be two up cards in front of the dealer representing the community cards for the players.

17. Starting with the player on his right, the dealer turns over that player's hand and determines if it is a winning hand according to the payout schedule for the basic LET IT RIDE® game. If the player does not have a winning hand, the dealer collects the remainder of the player's wager and places it in the chip tray. If the player does have a winning hand according to the LET IT RIDE® payout schedule, the dealer pays the player the amount indicated on the schedule.



18. To determine the bonus payment, the dealer touches the key on the control panel which indicates the player's position (the light will begin to flash). The dealer touches the key representing the player's hand. The dealer touches the enter key. The dealer then looks at the instruction window for the next step (i.e., whether to pay the player or notify a floor supervisor, what amount to pay, etc.).

19. Once a bonus has been paid to a player and approved by the appropriate casino authorities, the dealer collects that player's cards and places them face down in the discard rack. The dealer touches the enter key again. The dealer then moves on to the next player from his right (counter-clockwise) and follows the same procedures outlined in steps 18 through 21.

20. When the dealer finishes with the last player (the first player on his left), he collects those cards and the two community cards in front of the dealer and places them face down in the discard rack. The dealer then touches the "Game Over" switch on the control panel.

#### Irregularities in Dealing Procedures:

##### 1. Entry Fee Light:

If a player puts up his \$1 wager (in the form of a metal gaming token provided by the casino) for his entry fee and his entry fee light does not activate, the dealer calls a floor supervisor for instructions. The supervisor then closes that position for play.

2. Too Many or Too Few Cards in Deck:

2 If the automatic card count light on the shuffler is flashing red after it has  
counted out the cards, the dealer calls a floor supervisor. The floor  
4 supervisor removes the cards from the discard rack and does a hand count on  
the table (adding in the cards that have been dealt to the players) to determine  
6 whether the card count is accurate. If the count results in fewer or more than  
52 cards, the round is declared a misdeal and all of the cards are collected. The  
8 floor supervisor removes the deck from the game and seals it to be held for  
further examination, if necessary. The supervisor then installs a new deck of  
10 the same color following the new deck dealing procedures.

3. Auto Shuffler Miscount:

12 Even if the automatic shuffler shows an accurate count, if any player has  
more or less than three cards, it is still considered a misdeal and a dead hand.  
14 The deck is removed and a floor supervisor is called.

4. Player Has Too Many or Too Few Cards In His Hand:

16 If *any* player has too many or too few cards (more or less than three) in  
his/her hand, the round will be declared a *misdeal*. The cards will be  
18 collected and new hands will be dealt from a new deck.

### Bonus Payments and How To Pay Them

As stated previously, if a player has paid the \$1 optional wager and entry fee and his hand consists of a straight or higher, he is eligible for the following cash bonus payments:

Royal Flush .....	\$20,000.00
Straight Flush .....	\$2,000.00
Four of a Kind .....	\$200.00
Full House .....	\$100.00
Flush .....	\$50.00
Straight .....	\$25.00

If a player has a straight (\$25) or a flush (\$50), the dealer pays the bonus from the chip tray upon verbal approval of the floor supervisor.

If a player has a full house (\$100) or four of a kind (\$200), payment is made upon approval of the pit boss.

If a player has a straight flush (\$2,000) or a royal flush (\$20,000), approval of the pit boss and the shift supervisor or casino manager is required before making payment.

### Optional Wager and Entry Fee

**Amount:** \$1 per hand paid prior to receiving cards.

**Token:** \$1 value metal gaming token provided by the casino.

Since the object of round one of the tournament is to get one of the hundred  
highest hands dealt during the posted time period, players may enter every time  
they play the basic LET IT RIDE® game.

Fifty-five cents of each \$1 entry fee collected by the casino is remitted to the  
tournament organizer. The remaining 45¢ is retained by the casino. Each casino is  
responsible for paying any bonuses the entrants may qualify for during round one.  
If the bonus awards paid by a casino are less than the amount collected, the casino is  
entitled to keep the money as its own. If the bonus awards paid out exceed the  
money collected by the casino, the casino must make up the difference.

The 55¢ remitted to the tournament organizer is deposited into a holding  
account. This money constitutes the prize money available to be paid to players as  
they advance to rounds two through five.

### **Qualifying Hands**

*Only* the player who receives a qualifying hand is allowed to advance to  
rounds two through five. Qualifiers for any round may not sell, donate, or in any  
way transfer their rights to continue in the tournament.

If a qualifier is unable to continue in the tournament for any reason  
whatsoever—including death—no one will be allowed to substitute for that person  
and continue in his place. (This rule is intended for the protection of the  
tournament qualifiers as well as the integrity of the tournament.)

If a player has more than one qualifying hand, only his or her highest hand  
2 will be allowed to advance to round two.

A qualifying hand may not be used in any tournament other than the one in  
4 which it is received.

### Registering Qualifying Hands

6 In addition to the normal IRS paperwork, all straight flush and royal flush bonus  
winners must complete the "LET IT RIDE® Bonus Winner Form". If a player does  
8 not complete this form, then he will not be considered a qualifier for round two.

If a player who gets four of a kind and has paid the entry fee wants to register  
10 as a potential qualifier for round two, then he must complete the "LET IT RIDE®  
Bonus Winner Form" in full.

12 In addition, each player must be photographed with a polaroid camera. The  
player must sign the back of the photo. The photo is submitted to the tournament  
14 organizer along with the "LET IT RIDE® Bonus Winner Form".

Upon completion of the paperwork, the pit boss or shift boss must notify the  
16 tournament organizer by phone with the following information:

- Person Calling
- 18 • Casino Name
- City
- 20 • Time
- Date
- 22 • Player's Name
- Type of Hand
- 24 • Form Number

The tournament organizer must receive an original or facsimile of the form and  
photo within 48 hours.

The multi-tiered wagering game of the present invention, including the LET  
IT RIDE® game aspects thereof, might be played live with a dealer at one or more  
gaming tables in one or more casinos, or in casinos, homes, and other locations in  
interactive electronic or video form with automatic coin or betting means symbols,  
receptacles and payout capability, wherein appropriate symbols for cards, wagers, or  
score keeping would be displayed electronically.

With reference to the Figs. 1 and 2-10, a more detailed description of the  
apparatus for playing the multi-tiered wagering game in conjunction with the LET  
IT RIDE® game follows. As shown in Fig. 1, a playing table 10 has seven player  
positions 18a-g. Each of the playing positions 18a-g includes a wagering zone 22,  
comprising three separate and distinct wagering or betting areas 22a, b, c, for  
receiving or indicating a wager in the basic game. Also, each position 18a-g includes  
a card area 19a-g for receiving and displaying cards dealt to the player occupying the  
position. A suitable wagering area or apparatus for receiving or indicating a wager  
and entry fee in the multi-tiered wagering game (i.e., the bonus pay-off and the  
second game, playoff or tournament) is represented at area 23a-g. The wagering  
areas 22a, b, c, and 23a-g may be designed to receive appropriate wagering indicators  
or settling means such as gaming tokens or chips (not shown). Prior to each hand  
of the LET-IT-RIDE® game, or related table game, each player at the table 10 must

decide whether to enter the multi-tiered wagering game by placing a gaming token  
in wagering area 23a-g. Placing a gaming token in wagering area 23a-g indicates that  
the player has entered the additional game which is part of the multi-tiered  
wagering game.

At one side of the dealer station 20, the apparatus for practicing the method of  
the multi-tiered wagering game may include a microprocessor or computer  
controlled shuffling machine 32 supported by a table extension 34. The shuffling  
machine 32 may be of the type disclosed in U.S. Patent 4,807,884, the disclosure of  
which patent is incorporated herein by reference. The shuffling machine 32 may  
include a dealing module for automatically and sequentially dealing cards and also  
may include a display means for displaying wager amounts, the identity of winning  
players, or other game related information, including the prize amount.

Also, Fig. 1 shows a dealer control panel 70. The dealer control panel 70  
includes four sets of inputs: the game status inputs 72; the keypad 74; the player  
position inputs 76; and the winning hand inputs 78. The game status inputs 72  
allow the dealer to enter information on the status of the multi-tiered game. The  
dealer depresses the "Begin Game" button 80 when all players at the table have  
made their betting selections prior to the start of each game. At this time, the player  
betting information is sent to the facility computer 86 (see Fig. 4).

When the game is over, the dealer depresses either the "Game Over" button  
82 or the "Winner" button 84. Selection of the "Game Over" button 84 resets sensor

devices 118 (which will be described later) where one sensor device 118 is aligned  
with and in sensing proximity to a wagering area 23a-g, and betting for a new game  
is initiated. The dealer selects the "Winner" button 84 when one or more players  
participating in the additional game of the multi-tiered game have one of the  
winning hands. Next, a security code is entered on the keypad 74. For lower payout  
winners, the dealer will have a unique security code to enter. For the highest  
payout hands, the pit boss or shift manager will have a different unique security  
code. Therefore, one of these supervisory managers confirms the high payout hand  
before the information is entered and the payout is made. For example, the two  
different security codes are four-digit codes distributed daily.

Next, the dealer inputs the player position 18a-g of the winning hand by  
selecting the corresponding player position input 76 for the winning player. Finally,  
the dealer inputs the winning hand by selecting the appropriate winning hand  
input 78.

In an alternative embodiment, the keypad 74 is also used to activate or disable  
the multi-tiered gaming inputs 23a-g, 72, 76, 78 at a table 10. A specific four-digit  
code disables all of the multi-tiered game inputs 23a-g, 72, 76, 78 at the gaming table  
10 and another four-digit code activates the multi-tiered gaming inputs 23a-g, 72, 76,  
78 at a table 10.

Fig. 3 shows the player input and dealer control panel circuitry. Each sensor  
device 118 (which will be described later in this specification), one such device is



located under each of the wagering areas 23a-g, is connected through an input device  
2 88 to a microcontroller 90. An example of input device 88 is an Inverting Octal Tri-  
state Buffer, available from National Semiconductor, Santa Clara, California 95051.  
4 The microcontroller 90 may be selected from a variety of commercially available  
microcontrollers such as the 80C32 microcontroller, available from Intel  
6 Corporation, Santa Clara, California. When the presence of a gaming token is  
detected by the sensor device 118, the microcontroller 90 turns on the LEDs 146  
8 through the output device 92. When the LEDs 146 which surround the sensor light  
up, the LEDs 146 signal to the player and the dealer that the bet placed by the player  
10 for entry into the second game has been registered by the microcontroller 90. An  
example of output device 92 is a Darlington Array, available from Allegro  
12 Microsystems Inc., Worcester, Massachusetts 01615.

When all of the players at a table 10 have made their betting selection with  
14 regard to the additional game of the multi-tiered game, the dealer depresses "Begin  
Game" button 80 on the dealer control panel 70. The encoded betting information is  
16 sent from the microcontroller 90 to an RS422 transceiver 94 and, referring to Fig. 4,  
the encoded betting information is sent over network 96 to the facility computer 86.  
18 The facility computer 86 can be one of numerous commercially available personal  
computers generally having a monitor, microprocessor, information storage, and  
20 I/O ports, for example, an IBM PS/1, available from IBM, Armonk, New York.

As shown in Fig. 4, the facility computer 86 receives betting and winning  
hand information from all of the tables 10 connected to the network 96. Generally, a  
maximum of thirty-two devices can be connected to the facility computer 86 via the  
RS422 interface network. Therefore, a facility having more than thirty-two gaming  
tables 10 equipped for multi-tiered gaming will have more than one facility  
computer 86.

As shown in Fig. 5, the facility computers 86 are electronically linked to a  
central computer 98 by telephone lines or other circuitry well known to one of  
ordinary skill in the art. The central computer 98 may be located at a site separate  
from all of the facility computers 86 or co-located at one of the gaming facilities. The  
central computer 98 may also be one of the generally available personal computers  
such as the IBM PS/1 available from IBM. In an alternative embodiment of the  
invention, one of the facility computers 86 acts as both the facility computer 86 for a  
gaming facility and as the central computer 98.

The central computer 98 receives all of the betting and winning hand  
information from the facility computers 86 and computes the multi-tiered prize  
amount. The central computer 98 receives the number of bets and number and type  
of winners from each gaming table 10. A unique address identifies each table 10 at  
each gaming facility. The central computer 98 includes a data base and associated  
accounting software. The data base allows the central computer 98 to compare the  
number of actual payoffs to the anticipated number of payoffs to detect any cheating

or other irregularities at any of the tables or facilities. The central computer 98 can  
2 generate a variety of accounting reports on each table or gaming facility on a daily  
basis. If the new prize amount is computed each time new betting or winning hand  
4 information is received by the central computer 98, then the new prize amount is  
sent to the facility computers 86 as soon as practicable. However, this new prize  
6 amount should be sent to the facility computers 86 at least every five minutes. It  
should be noted that the prize is preset for a minimum amount. Only when the  
8 betting exceeds a certain amount will this calculation affect the amount of the prize.

As shown in Fig. 4, the facility computer 86 is also connected by the RS422  
10 network to a display center 100. As shown in Fig. 6, the display center 100 includes  
an RS422 transceiver 102 connected to a microcontroller 104 which is the same type  
12 as used in the dealer control panel shown in Fig. 2. The facility computer 86 sends  
the prize amount over the network 96 to the display board microcontroller 104. The  
14 display board microcontroller 104 drives row drivers 106 and column drivers 108 to  
display the prize amount on a typical alphanumeric LED display 110. Column  
16 drivers 108 can be the same device as output devices 92, e.g., a Darlington Array,  
available from Allegro Microsystems Inc., Worcester, Massachusetts 01615. Row  
18 drivers 106 can be a Quad High-Current High-Voltage Source Driver, available from  
Allegro Microsystems Inc., Worcester, Massachusetts 01615.

20 As shown in Fig. 3, each of the game status inputs 72, player position inputs  
76, and winning hand inputs 78 has a pressure-sensitive actuating switch 112

multiplexed through an input device 88 to microcontroller 90. Microcontroller 90  
2 turns on input light 114 through output device 92 to show that the input has been  
selected.

4 At the end of the table game, e.g., "LET IT RIDE®," the dealer determines  
whether there are any game winners in the additional game of the multi-tiered  
6 game. For each winner the dealer selects the "Winner" button 84 on the dealer  
control panel 70. If the winning hand is one of the high payout hands, e.g., royal  
8 flush or straight flush, the dealer notifies either the pit boss or shift manager who  
confirms the winning hand and enters a security code on the keypad 74. Keypad 74  
10 is selected from commercially available 3 x 4 keypads and is connected to  
microcontroller 90 by keypad encoder 116, e.g., Model 8279, available from Intel  
12 Corporation, Santa Clara, California. The dealer then depresses the player position  
input 76 corresponding to the player having a winning hand. Next, the dealer  
14 depresses the particular winning hand input 78, e.g. royal flush, straight flush, four  
of a kind, or full house. After all winning hand entries have been made, or if there  
16 were no winners for the hand, the dealer selects the "Game Over" button 82 and the  
next game can be initiated.

18 With reference to the Figs. 1, 3, and 7-10, a more detailed description of the  
apparatus of the present invention follows. As shown in Fig. 1, the gaming table 10  
20 has wagering areas 23a-g, where players place a gaming token to enter the additional  
game of the multi-tiered wagering game. A sensor device 118, having a sensor 144

(as will be described with reference to Figs. 7 and 8) is mounted to a gaming table 10 such that the sensor 144 is aligned with and in sensing proximity to a wagering area 23a-g. Each sensor 144 is within sensing proximity of a wagering area 23a-g, which is between .8 mm to 50 mm (i.e., within 2 inches of the wagering area 23a-g). This distance can vary depending on the particular sensor 144 that is used. In the preferred embodiment, a sensor device 118 is mounted below a wagering area 23a-g and is mounted adjacent the bottom of the table surface 16.

As shown in Fig. 3, each of the sensor devices 118 are connected to the microcontroller 90 through inputs 88. Moreover, a lighting device 146, which is in the sensor device 118, is connected to the microcontroller 90 through the output 92, so that when the sensor device 118 detects the presence of a gaming token in the wagering area 23a-g it monitors, the microcontroller 90 causes the corresponding lighting device 146 to light up.

With reference to Figs. 7 and 8, the sensor device 118 will be described. The sensor device 118 comprises a housing 136, a cover plate or gaming token supporter 138, a holder 140, a first board 142, a sensor 144, at least one lighting device 146, a first set of supports 148, a second board 150, a decoder connector 152, a second set of supports 154, a closing plate 156, fasteners 158, and a securing ring 160.

The housing 136 is constructed of aluminum and provides a casing for the sensor 144. The housing 136 has a top 162 and a bottom 164. In the embodiment shown in Figs. 7 and 8, the body 166 of the housing 136 is cylindrical. The

cylindrical body 166 has a circular cross section which has an inner diameter 165 and an outer diameter 167. The lip 168 located at the top 162 of the housing 136 extends into the cylindrical body. Moreover, the body 166 has an outer surface 170 and an inner surface 172. The outer surface 170 of the cylinder 166 has grooves (not shown) for receiving the securing ring 160.

The gaming token supporter or cover plate 138 may be a plastic lens. The cover plate 138 is inserted into the housing 136 such that it abuts the lip 168. This cover plate 138 protects the surface of the sensor 144 and is flush mounted to the gaming surface and forms at least a portion of a wagering area 23a-g.

Although, in the preferred embodiment, the gaming token supporter 138 forms a portion of the housing 136, the gaming token supporter 138 may be separate from the housing 136. However, the gaming token supporter 138 must be mounted such that the gaming token receiving surface is flush with the gaming surface of the gaming table 10 and the gaming token supporter 138 should be with aligned to and in sensing proximity with the sensor 144.

The holder 140, which is inserted into the housing 136, receives the sensor 144. The holder 140 has an outer edge 176 and an inner edge 178. The inner edge 178 forms an opening 180 which receives the sensor 144. As shown in Fig. 7, the opening 180 is circular because the sensor 144 depicted in Fig. 2 is circular. However, this opening 180 may have any shape as long as the opening 180 can receive the

sensor 144. Also, the holder 140 is made of material that allows light from the  
2 lighting devices 146 to be visible through the cover plate 138.

The sensor 144 and the lighting devices 146 are fastened to the first board 142.

4 The first board can be made of any material which has the rigidity to support the  
sensor 144 and the lighting devices 146. This first board 142 must have a shape  
6 which will allow the board 142 to be inserted into the housing 136. In the  
embodiment shown in Figs. 7 and 8, the first board 142 is circular and has a diameter  
8 182 which is less than or equal to the inner diameter 165 of the housing 136.

The sensor 144 may be a type of photoelectric sensor. In the preferred  
10 embodiment, an Omron photoelectric sensor having model number EE-SPZ401A is  
used. This type of photoelectric sensor has an infrared transmitter and an infrared  
12 receiver. In operation, the photoelectric sensor senses the presence of a gaming  
token on the gaming token supporter by determining whether a signal transmitted  
14 by the transmitter is reflected by the gaming token and received by the receiver. If a  
signal is received by the receiver, then a gaming token has been placed on the  
16 gaming token supporter. However, if the receiver does not receive a signal, then a  
gaming token has not been placed on the gaming token supporter.

18 Alternatively, a type of photoelectric sensor that operates on the basis of  
detecting the presence or absence of light may be used. In this type of a photoelectric  
20 sensor, the photoelectric sensor operates based on light sensed by the photo electric  
sensor. Ambient light sensed by the photo electric sensor through the gaming token

supporter 138. This sensed ambient light turns on the photoelectric sensor. When a gaming token is placed on the game token supporter 138, ambient light is cut off, which causes the photo electric sensor to turn off. This change in the state of the photoelectric sensor enables the decoder to detect the presence of a gaming token in the wagering area.

Also, these sensors 144 are mounted in sensing proximity to a gaming token supporter and, thereby, a wagering area 23a-g. Generally, a sensor 144 may be within 2 inches of the wagering area 23a-g the sensor 144 is monitoring. The actual distance between the sensor 144 and the wagering area 23a-g varies based on the selection of a sensor 144.

The lighting device 146 may be any type of light producing element. In the preferred embodiment, a light emitting diode ("LED") is used. In fact, as shown in Figs. 7 and 8, six LEDs are used in the present invention. This lighting device 146 is not necessary for detecting the presence of a gaming token. However, they provide (1) a visual indication to the dealer and the player that a bet has been registered; and (2) an easy target for the cameras monitoring a table 10 so that the computer's registration of a bet can be visually verified by the camera.

The sensor 144 is secured to the first board by a bolt 82 (shown in the inset to Fig. 8). The LEDs may be secured to the first board 142 by simply placing them in the openings created in the first board 142 for receiving such devices 146.



A second board 150 is attached to the first board 142 by the first set of supports  
2 148. The supports are aluminum supports which are secured to the first plate 142 by  
screws 186. The second board 150 has a first side 188 and a second side 190. A decode  
4 connector 152 is connected to the second side 190 of the second board 150. The  
sensor 144 and the lighting devices 146 are electrically connected to the decode  
6 connector 152 via the connector 192.

A closing plate 156 having a shape which will conform to the shape of the  
8 housing 136 is secured to a second set of supports 154. This closing plate 156 will  
have an opening 194 so that the electrical connection from a decoder can be  
10 connected to the decoder connector 152. This electrical connection will allow a  
decoder such as a microcontroller 90 to read the sensor 144 and transmit the  
12 information to the facility computer 86, which may tie several gaming tables and  
video gaming machines together or which may tie several gaming facilities which  
14 may have table gaming and/or video gaming together.

The decoder connector 152 is a modular connector which allows an electrical  
16 connector to be plugged into the connector 152. The securing ring 160 secures the  
sensor device 118 to the table 10 so that the sensor 144 is aligned with a wagering  
18 areas 23a-g corresponding to a player position 18a-g. In the preferred embodiment,  
the sensing apparatus will be located below each one of the wagering areas 23a-g and  
20 located adjacent to the bottom of the table surface 16, such that the sensor device 118  
is aligned with a wagering area 23a-g.

One advantage of this modular construction of the apparatus for sensing the presence of a gaming token is that the apparatus can be easily maintained. The apparatus is mounted to the gaming table 10 such that it is easily accessible, thereby, allowing for easy removal and replacement of the module.

With reference to Fig. 10, an alternative embodiment of the housing will be described. As shown in Fig. 10, this embodiment of the housing differs from that shown in Fig. 7 in that the housing includes a third board 147 for supporting the photoelectric sensor 144.

Fig. 9 shows the electrical connections between the sensor 144 and the decoder connector 152. There are five lines providing electrical connection from the decoder connector 152. One line 199 is connected to ground. Electrical lines 200, 202, 204, and 206 are connected to the photoelectric sensor 144 and the LEDs 146. As shown, the items on the first board 142 include the photoelectric sensor 144, the LEDs 146, and a Zener diode 196. The LEDs 146 and the photoelectric sensor 144 are connected to a twelve volt power supply 198. The Zener diode 196 allows electrical line 200 to have a constant voltage. When there is no object being sensed, the switch signal line 202 is at twelve volts. Once there is an object being sensed by the sensor 144, the switch signal 202 is driven to zero volts. This drop in voltage is transmitted via the decoder connector 152 to the microcontroller 90, where the microcontroller 90 determines that a gaming token has been sensed.

Electrical lines 204, 206 from the decoder connector 152 are connected to the

two sets of three LEDs 146. This configuration will only prevent one set of three LEDs to not function if any one LED becomes defective. The microcontroller 90 may be able to detect when an LED is defective based on the voltage reading on line 206.

In operation, a player may choose to place a bet in area 23a-g, thereby entering the additional game of the multi-tiered wagering game. To place the bet, each player slides the gaming token onto the flush mounted gaming token supporter 138.

When the dealer locks in all the bets at the dealer control panel 70 using the "Begin Game" button 80, the microcontroller 90 reads the outputs at the various

photoelectric sensor devices 118 at each table 10. If there is no gaming token at a betting area 23a-g corresponding to a particular player position 18a-g, then the

switching line 202 for the photoelectric sensor device 118 corresponding to the particular player position 18a-g is at twelve volts. When the microcontroller 90

reads a twelve volt signal on this line 202, the microcontroller 90 will determine that there is no gaming token at this betting area 23. However, if there is a gaming

token placed in a betting area 23a-g, then the corresponding switch signal 202 will be zero volts and the microcontroller 90 will determine the presence of a gaming token

and register the bet. Upon detecting the presence of a gaming token, the microcontroller 90 will enable the LEDs 146 to be lit. Also, this betting information

will be sent to the facility computer 86 and the central computer 98.

After the game is played, if a player entered the additional game of the multi-tiered game, the keypad 74 will instruct the dealer to pay the player if he has a configuration of cards which requires a payout. After the game is played, the dealer may clear the gaming table by simply sweeping the gaming tokens of the table. Because the gaming token supporter 138 is flush mounted, the gaming token supporter 138 will not impede the dealer from clearing the table. The apparatus of the present invention allows the gaming token to be kept in circulation by the casino. Also, this apparatus accurately and reliably allows the detection of the presence of a gaming token in a particular betting area.

The present invention may be embodied in other specific forms without departing from the essential attributes thereof. It is desired that the embodiments described above be considered in all respects as illustrative, not restrictive, reference being made to the appended claims to indicate the scope of the invention.

## Claims

2 What is claimed is:

1. A gaming apparatus, comprising:

4 (a) a gaming table with a gaming surface having at least one  
predetermined location for receiving a gaming token;

6 (b) a gaming token supporter mounted at each of the at least one  
predetermined location for receiving a gaming token on the gaming surface of the  
8 gaming table such that the gaming token supporter is flush with the gaming surface  
and forms a gaming token receiving location; and

10 (c) a photoelectric sensor for each gaming token supporter, each  
photoelectric sensor mounted to the gaming structure such that each sensor is  
12 aligned with and in sensing proximity to a gaming token supporter.

2. The apparatus of claim 1, wherein the gaming token supporter forms a  
14 portion of a sensor housing.

3. The apparatus of claim 2, wherein the sensor housing comprises a first board  
16 having a outer edge and at least one continuous inner edge, the inner edge forming  
a sensor holder, the sensor holder having dimensions such that a sensor can be  
18 received by the sensor holder and the sensor holder positioned such that the  
received sensor will be aligned and in sensing proximity to the gaming token  
20 supporter.

4. The apparatus of claim 3, wherein the sensor is formed by one of a photo  
electric sensor and a non-photo electric proximity sensor.

5. The apparatus of claim 3, further comprising a decoder electrically connected  
to each sensor for determining whether a gaming token is present at the gaming  
token location monitored by each sensor.

6. The apparatus of claim 5, wherein the first board comprises a plurality of  
continuous inner edges forming a plurality of holders, wherein a plurality of  
lighting devices may be received by the holders

7. The apparatus of claim 6, wherein the lighting devices are connected to the  
decoder.

8. The apparatus of claim 5, wherein the decoder is a microcontroller.

9. The apparatus of claim 5, wherein the decoder is a hard wired circuit.

10. A gaming apparatus, comprising:

(a) a gaming table with a gaming surface having at least one  
predetermined location for receiving a gaming token;

(b) a photoelectric sensor for each of the at least one predetermined  
location, each photoelectric sensor mounted to the gaming structure such that each  
sensor is aligned with and in sensing proximity to one of the at least one  
predetermined location; and

(c) a sensor housing for each sensor having a gaming token supporter,

wherein the gaming token supporter is flush mounted to the gaming surface and forms a gaming token receiving location.

11. The apparatus of claim 10, further comprising a decoder electrically connected to each sensor for determining whether a gaming token is present at the gaming token location monitored by each sensor.

12. The apparatus of claim 10, wherein the sensor housing comprises a first board having a outer edge and at least one continuous inner edge, the inner edge-forming a sensor holder, the sensor holder having dimensions such that the sensor can be received by the sensor holder.

13. The apparatus of claim 3, wherein the first board comprises a plurality of continuous inner edges forming a plurality of holders, wherein a plurality of lighting devices may be received by the holders.

14. The apparatus of claim 13, wherein the lighting devices are connected to the decoder.

15. The apparatus of claim 10, wherein the decoder is a microcontroller.

16. The apparatus of claim 10, wherein the decoder is a hard wired circuit.

17. A method for playing a series of casino card games between a casino and a plurality of players, with a prize, comprising:

(a) each player placing a first wager to become a participant in the casino card game;

- (b) each player placing an entry fee to become eligible to win the prize;
  - 2 (c) determining whether a player has placed the entry fee to become  
eligible to win the prize by using a proximity sensor device;
  - 4 (d) dealing a hand of cards to each player;
  - (e) resolving each player's first wager based on said hand, wherein if a  
6 player's hand comprises a predetermined arrangement of cards, that player wins a  
preselected amount from the casino;
  - 8 (f) resolving each player's entry fee, wherein if a player's hand comprises a  
narrower subset of the predetermined arrangement of cards, that player becomes a  
10 finalist eligible to win the prize; and
  - (g) playing a second game to select a winner of the prize.
- 12 18. An apparatus for playing a multi-tiered game, comprising:
- (a) a plurality of gaming tables, each table having a plurality of player  
14 positions;
  - (b) wagering areas on the table, with at least one wagering area  
16 corresponding to each of the plurality of player positions;
  - (c) a gaming token supporter flush mounted to the gaming surface to  
18 form a wagering area;
  - (d) sensor means mounted to the plurality of gaming tables, wherein each  
20 sensor means comprises a sensor, with one of the sensors being aligned with and in  
sensing proximity to a wagering area;



(e) dealer control means at each table, connected to the sensor means, for determining whether a gaming token is present in each of the plurality of wagering areas, accumulating the betting information from each plurality of sensor means, and entering data on winning outcomes in the multi-tiered game, wherein the dealer control means includes means for entering a security code prior to entering data on winning outcomes, a plurality of inputs, each input designating one of a plurality of winning outcomes and one of the plurality of player positions at a gaming table of the multi-tiered game; and

(f) computer means operably connected to each dealer control means for continuously accumulating the betting information and winning outcome data for the multi-tiered game, calculating a prize amount for the multi-tiered game, and controlling a display means operably connected to the computer means for displaying the prize amount for the multi-tiered game.

19. The apparatus of claim 18, wherein the plurality of gaming tables is located at different gaming facilities.

20. The apparatus of claim 19, wherein the computer means includes a plurality of facility computers, each facility computer operably connected to a plurality of gaming tables, and a central computer operably connected to the plurality of facility computers.

21. The apparatus of claim 19, wherein the dealer control means, computer means, and display means are operably connected to each other by a local network.

22. The apparatus of claim 20, wherein the display means includes an  
2 alphanumeric LED display.

Abstract of the Disclosure

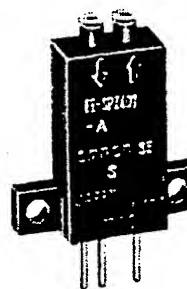
2       The present invention relates to a gaming apparatus comprising a gaming  
table with a gaming surface having at least one predetermined location for receiving  
4   a gaming token. A gaming token supporter is mounted at each of the at least one  
predetermined location for receiving a gaming token on the gaming surface of the  
6   gaming table such that the gaming token supporter is flush with the gaming surface  
and forms a gaming token receiving location. A photoelectric sensor for each  
8   gaming token supporter is mounted to the gaming table such that each sensor is  
aligned with and in sensing proximity to a gaming token supporter.

10

## EE-SPZ301-A/401-A


### Long Sensing Distance with Built-in Amplifier and Light Modulation

- Light modulation effectively reduces external light interference
- Easy adjustment and optical axis monitoring with a Light-ON operation indicator
- Wide operating voltage range (5 to 24 VDC) makes smooth connection possible with a TTLs, relays, and programmable controllers (PLCs)
- Easy-to-wire connector assures ease of maintenance
- Convert to PNP output with EE-2001 conversion connector



## Ordering Information

### ■ PHOTOMICROSENSORS

Appearance	Sensing method	Sensing distance	Output configuration	Weight	Part number
	Diffuse (Retroreflective)	200 mm (See note)	Dark-ON	Approx. 3.0 g	EE-SPZ301-A
			Light-ON		EE-SPZ401-A

Note: When used with E39-R1 reflector.

### ■ ACCESSORIES

Name	Part number
Solder connector	EE-1002
Connector with 1 m cable	EE-1003
Connector holder for EE-1003	EE-1003A
Reflector	E39-R1

## Specifications

### ■ RATINGS

Model	EE-SPZ301-A	EE-SPZ401-A
Supply voltage	5 to 24 VDC $\pm 10\%$ , ripple (p-p): 5% max.	
Current consumption	Average: 15 mA max.; Peak: 50 mA max.	
Operating modes	Dark-ON	Light-ON
Response frequency	100 Hz	
Model	EE-SPZ301-A	EE-SPZ401-A
Control output	At 5 to 24 VDC: 80-mA load current ( $I_C$ ) with a residual voltage of 1 V max. When driving TTL: 10-mA load current ( $I_C$ ) with a residual voltage of 0.4 V max.	
Light source	GaAs infrared LED (pulse-modulated) with a wavelength of 940 nm	
Receiver	Si photo-diode with a sensing wavelength of 850 nm max.	
Operation indicator	GaP red LED with a wavelength of 700 nm	

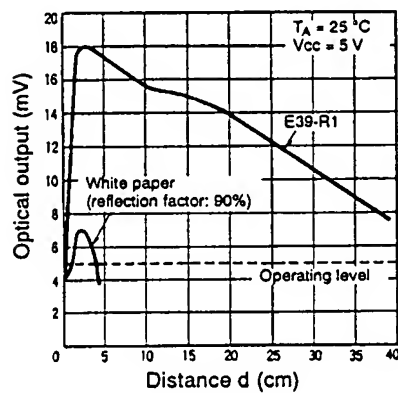
## CHARACTERISTICS

Ambient illumination		Sensing face: 3,000 lx max. (incandescent light, fluorescent light, and sunlight)
Enclosure ratings		IP50 (except terminals)
Ambient temperature	Operating	-10°C to 55°C (14°F to 131°F)
	Storage	-25°C to 65°C (-13°F to 149°F)
Ambient humidity	Operating	35% to 85%
	Storage	35% to 95%
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hrs each in X, Y, and Z directions
Shock resistance		Destruction: 500 m/s <sup>2</sup> (approx. 50G's) for 3 times each in X, Y, and Z directions
Cable length		5 m max. (AWG24 min.)
Connecting method		Applicable connectors: EE-1002, EE-1003; solder terminals/cordset

## Engineering Data

### RECEIVER OUTPUT VS. SENSING DISTANCE (TYPICAL)

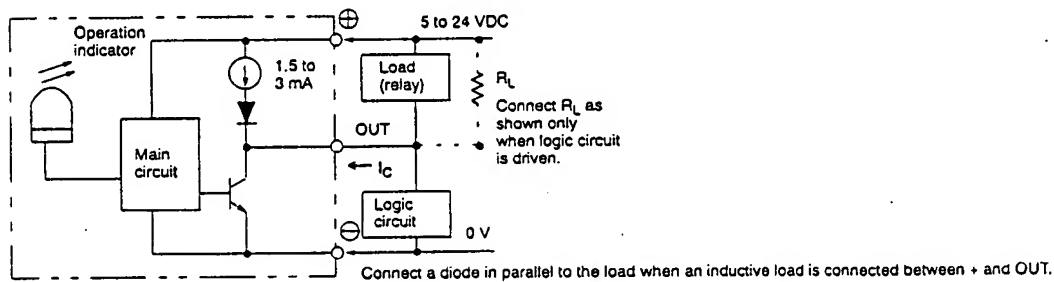
EE-SPZ301-A, EE-SPZ401-A with E39-R1



## Operation

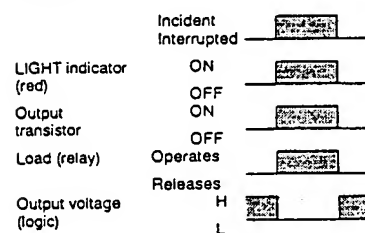
### INTERNAL/EXTERNAL CIRCUIT DIAGRAM

Light-ON/Dark-ON

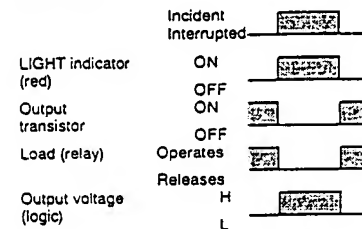


### TIMING CHART

Light-ON



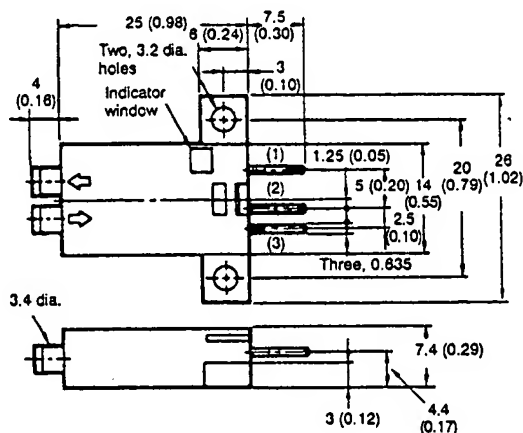
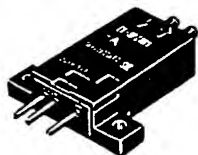
Dark-ON



# Dimensions

Unit: mm (inch)

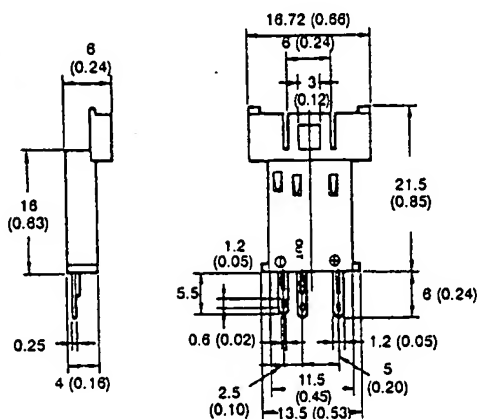
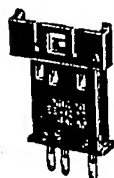
## ■ EE-SPZ301-A, EE-SPZ401-A



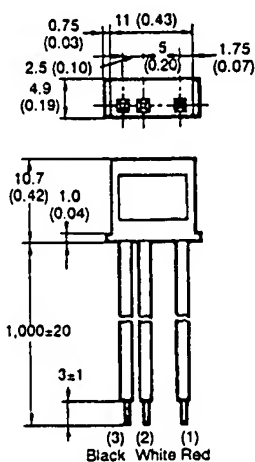
Terminal Arrangement

(1)	⊕	V <sub>CC</sub>
(2)	⊖	OUTPUT
(3)	⊖	GND (0 V)

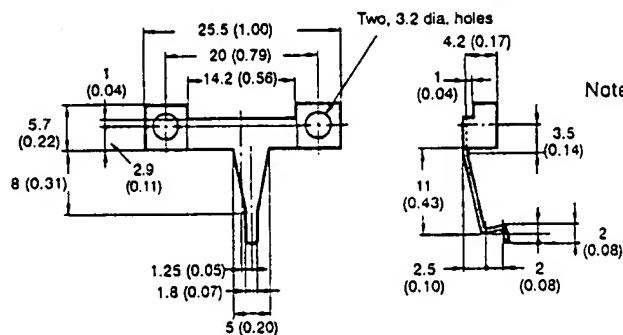
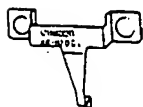
## ■ EE-1002 SOLDER CONNECTOR



## ■ EE-1003 CONNECTOR WITH CABLE

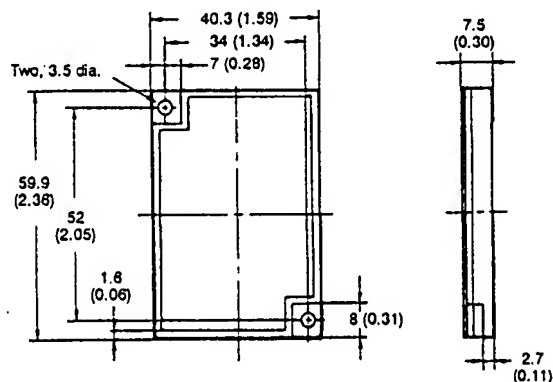
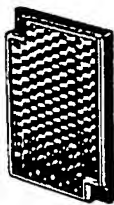


## ■ EE-1003A CONNECTOR HOLDER



Note: Use the EE1003A Connector Holder to prevent the EE-1003 Connector disconnecting accidentally from the EE-SPZ-A Photomicrosensor.

## ■ E39-R1 REFLECTOR



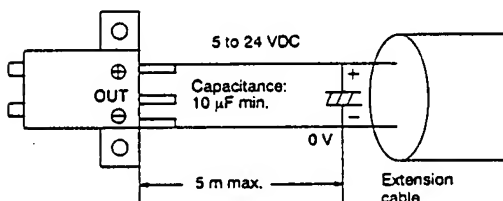
## Precautions

Refer the Technical Information Section for general precautions.

### ■ WIRING

A cable with a thickness of AWG24 min. and a length of 5 m max. must be connected to the output terminals.

To use a cable longer than 5 m, attach a capacitor with a capacitance of approximately 10  $\mu$ F to the wires, as shown below. The distance between the terminal and the capacitor must be within 5 m:



Do not solder the cable to the connectors. Use the EE-1002 Connector or EE-1003 Connector (with a 1-m cable attached) to connect the cable to the output terminals.

Use the EE1003A Connector Holder to prevent accidental disconnection of the EE-1003 Connector from the EE-SPZ-A Photomicrosensor.

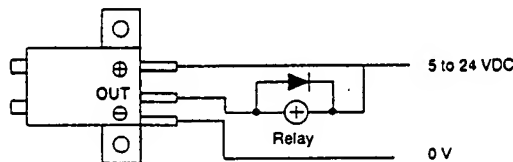
Do not impose excessive force on the terminals (refer to the diagram below). Excess force will damage the terminals.



If the metal mounting base is subjected to inductive electrical noise, the photomicrosensor can be activated accidentally. If noise is a problem, take the following precautions:

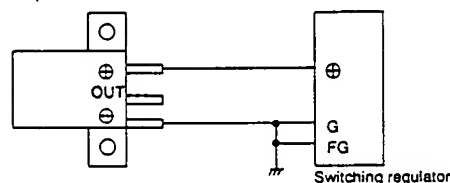
1. Connect the negative terminal to the mounting base to ensure that there will be no difference in electric potential between the photomicrosensor and mounting base.
2. Connect the negative terminal to the mounting base via a 0.47- $\mu$ F capacitor.
3. Insert a plastic insulating plate with a thickness of approximately 10 mm between the photomicrosensor and mounting base.

Wire as shown by the following illustration to connect a small inductive load (a relay for example) to the photomicrosensor. A diode must be connected parallel to the relay to absorb the reverse voltage.



### ■ POWER SUPPLY

When using a standard switching regulator, ground the FG and G terminal to ensure that the photomicrosensor will be in a stable operating condition.



NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: John Breeding                      Examiner: Benjamin Layno  
Serial No. 10/615,350                      Group Art Unit: 3711  
Filed: July 8, 2003                      Docket No. PA0894.ap.US  
Title: PHOTOELECTRIC GAMING TOKEN SENSING APPARATUS WITH  
FLUSH MOUNTED GAMING TOKEN SUPPORTER

CERTIFICATE UNDER 37 C.F.R. 1.8: The undersigned hereby certifies that this Transmittal Letter and the paper, as described herein, are being deposited in the United States Postal Service, as first class mail, with sufficient postage, in an envelope addressed to: MAIL STOP: AMENDMENT; Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on 6 NOVEMBER 2006.

Mark A. Litman  
Name

  
Signature

**DECLARATION OF MARK A. LITMAN**

MAIL STOP: AMENDMENT  
P.O. Box: 1450  
Commissioner for Patents  
Alexandria, VA 22313-1450

Dear Sir:

This is a Declaration of Mark A. Litman, Registration No. 26,390, the attorney of record, the Declaration to be filed along with an Amendment in response to the Office Action mailed on 10n August 2006 and is being filed in accordance with 37 C.F.R. 1.111.

**STATEMENT**

I do state and declare as follows:

1) My name is Mark A. Litman, and I am an attorney admitted to practice before the US Patent and Trademark Office, Registration No. 26,390.

2) I personally examined the file wrapper of abandoned US Patent Application Serial; No. 08/866,516, filed 10 March 1997.

3) I personally made two copies of the document within that file wrapper that was identified by the previous attorney of record as the specification, as filed in that application.

4) I personally sign this Declaration with one of the two copies I made of the document I believe to be the specification as originally filed as US Patent Application Serial No. 08.866,516 attached hereto.

**Further Declarant sayeth not.**

A handwritten signature in black ink, appearing to read 'Mark A. Litman', written in a cursive style.

Mark A. Litman

**6 Noveember 2006**

Mark A. Litman & Associates, P.A.